



Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP)

Advisory Committee Meeting

November 12, 2014

California Energy Commission
Hearing Room A



Meeting Agenda

- 10:00 Introductions and Opening Remarks
- 10:15 Program Status Update
- 10:45 Development of 2015-2016 Investment Plan Update
- 11:15 Advisory Committee Comments and Discussion
- 12:15 Lunch
- 1:15 Advisory Committee Comments and Discussion, cont.
- 2:00 Public Comment



Program Status Update

Jim McKinney
Program Manager



California Transportation: Nation-State Statistics

- Population: 38 million
- GDP: \$2.0 trillion - 8th largest global economy
- GHG Emissions: 458 MMT (2012)
 - Transportation accounts for 36 % of all GHG emissions
- Air Pollution: Severe Non-Attainment for Ozone
 - San Joaquin and South Coast Air Basins
- Vehicles: 27.5 million cars + 0.9 million trucks
- Annual Fuel Consumption: 18.1 billion gallons
 - 14.5 billion gallons gasoline + 3.6 billion gallons diesel
- Primary Roadways: 170,000 miles



Origins in Statute

Assembly Bill No. 8

CHAPTER 401

An act to amend Sections 41081, 44060.5, 44125, 44225, 44229, 44270.3, 44271, 44272, 44273, 44274, 44275, 44280, 44281, 44282, 44283, 44287, 44299.1, and 44299.2 of, to add and repeal Section 43018.9 of, and to repeal Section 44299 of, the Health and Safety Code, to amend Sections 42885 and 42889 of the Public Resources Code, and to amend Sections 9250.1, 9250.2, 9261.1, and 9853.6 of the Vehicle Code, relating to vehicular air pollution, and declaring the urgency thereof, to take effect immediately.

[Approved by Governor September 28, 2013. Filed with Secretary of State September 28, 2013.]

LEGISLATIVE COUNSEL'S DIGEST

AB 8, Perea. Alternative fuel and vehicle technologies: funding programs.

(1) Existing law establishes the Alternative and Renewable Fuel and Vehicle Technology Program, administered by the State Energy Resources Conservation and Development Commission, to provide to specified entities, upon appropriation by the Legislature, grants, loans, loan guarantees, revolving loans, or other appropriate measures, for the development and deployment of innovative technologies that would transform California's fuel and vehicle types to help attain the state's climate change goals. Existing law specifies that only certain projects or programs are eligible for funding, including block grants administered by public entities or not-for-profit technology entities for multiple projects, education and program promotion within California, and development of alternative and renewable fuel and vehicle technology centers. Existing law requires the commission to develop and adopt an investment plan to determine priorities and opportunities for the program. Existing law also creates the Air Quality Improvement Program, administered by the State Air Resources Board, to fund air quality improvement projects related to fuel and vehicle technologies.

This bill would provide that the state board has no authority to enforce any element of its existing clean fuels outlet regulation or other regulation that requires or has the effect of requiring any supplier, as defined, to construct, operate, or provide funding for the construction or operation of any publicly available hydrogen-fueling station. The bill would require the state board to aggregate and make available to the public, no later than June 30, 2014, and every year thereafter, the number of hydrogen-fueled vehicles that motor vehicle manufacturers project to be sold or leased over the next 3 years, as reported to the state board, and the number of hydrogen-fueled vehicles registered with the Department of Motor Vehicles through April 30. The bill would require the commission to allocate \$20 million annually, as specified, until there are at least 100 publicly available hydrogen-fueling

Established by Assembly Bill 118
(Nunez, 2007)

✓ \$100 million per year

Funding extended through January 1,
2024 by Assembly Bill 8 (Perea, 2013)

“...develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.”
(Health and Safety Code Section 44272(a))

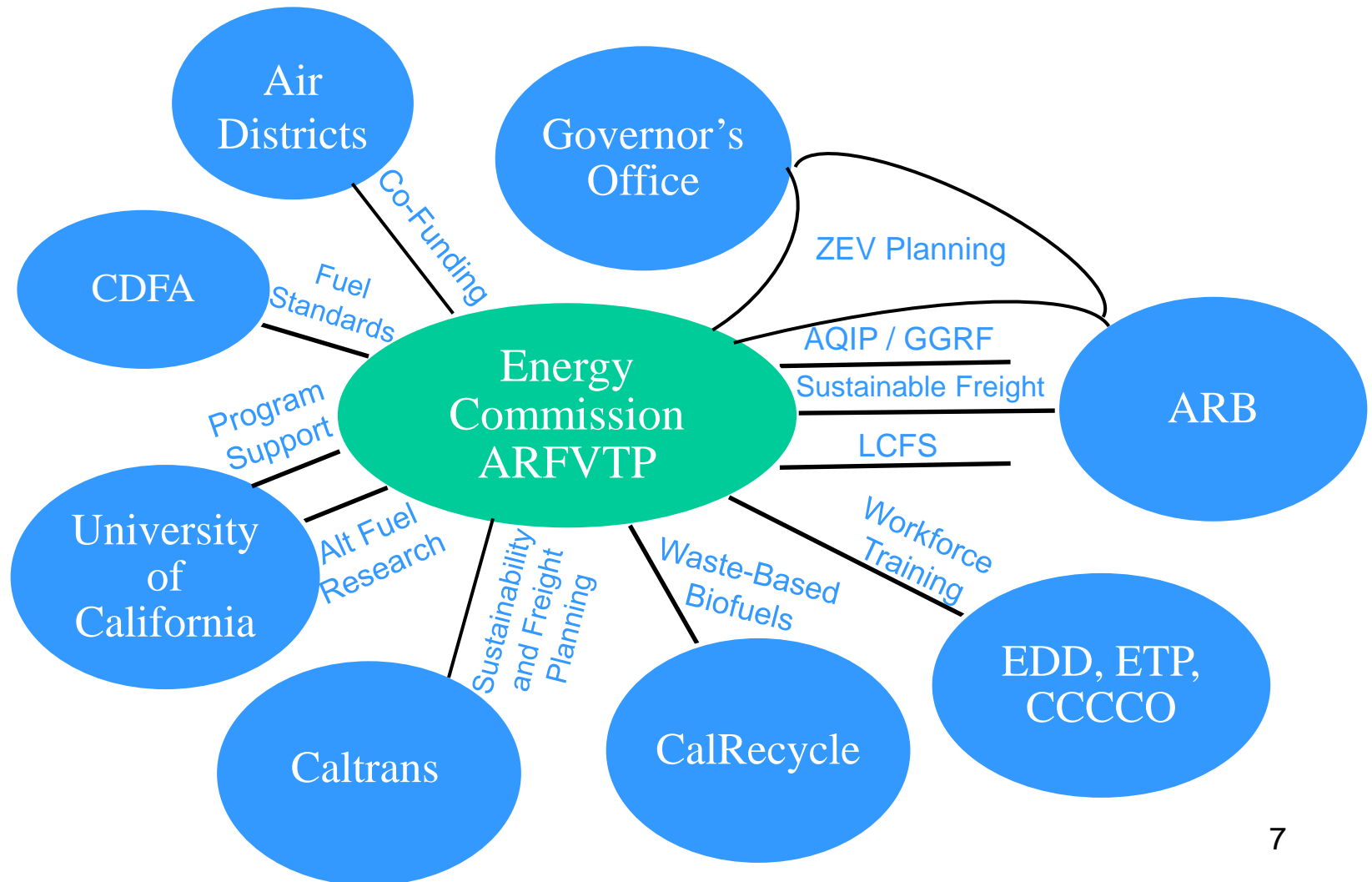


Key Policies and Regulations

Policy Objectives	Policy Origin	Goals and Milestones
Greenhouse Gas Reduction	AB 32, Executive Order S-3-05, LCFS	Reduce greenhouse gas emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050 in California
Petroleum Reduction	California <i>State Alternative Fuels Plan</i>	Reduce petroleum fuel use to 15% below 2003 levels by 2020 in California
Low Carbon Fuel Standard	AB 32, California Global Warming Solutions Act	10% reduction in carbon intensity of transportation fuels in California by 2020
Federal Renewable Fuel Standard	Energy Policy Act of 2005, Energy Independence and Security Act of 2007	36 billion gallons of renewable fuel by 2022
Air Quality	Clean Air Act	80% reduction in NOx from current levels by 2023
ZEV Mandate	California Executive Order B-16-2012	Accommodate 1 million EVs by 2020 and 1.5 million by 2025 in California

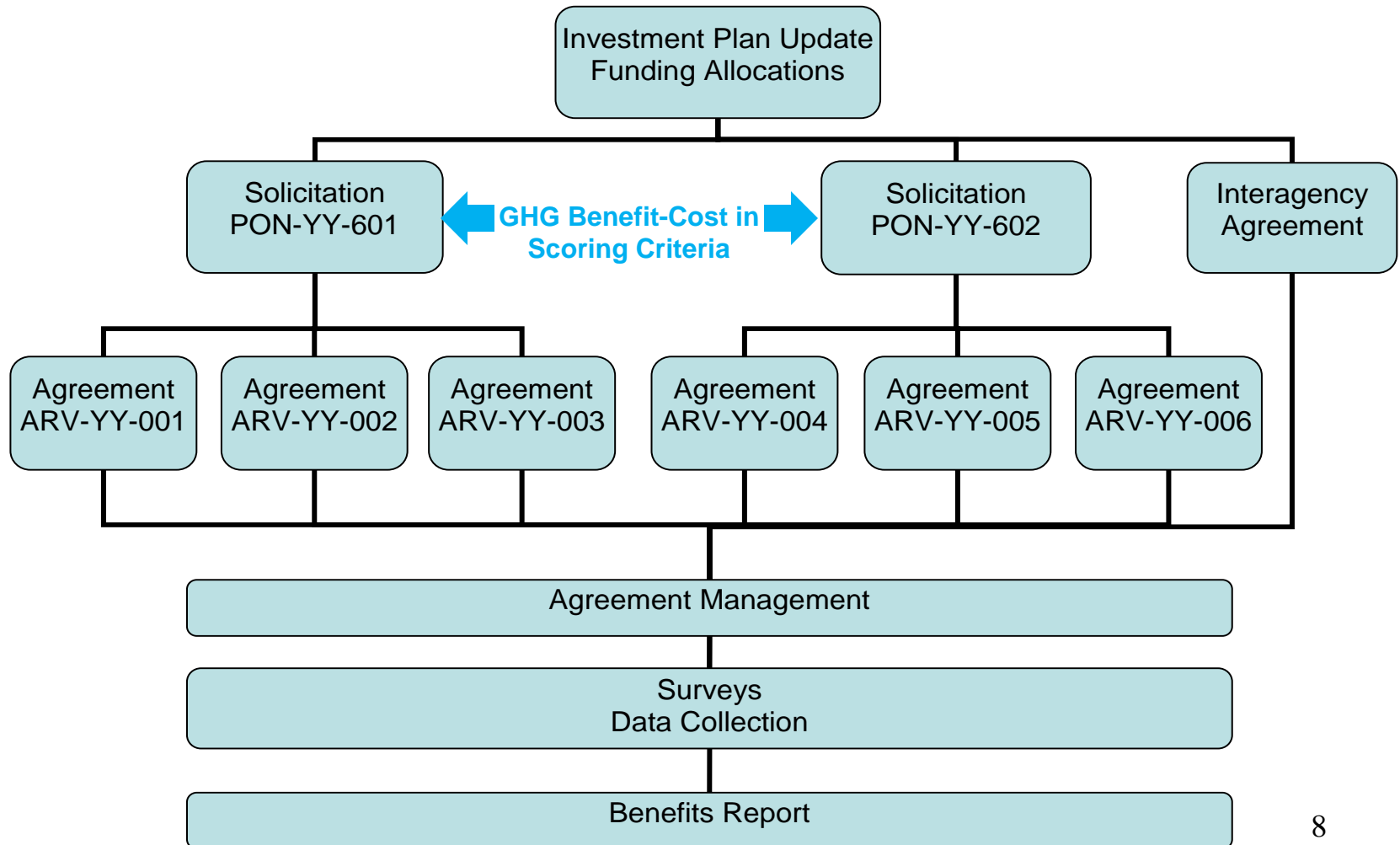


ARFVTP Coordination





Program Implementation



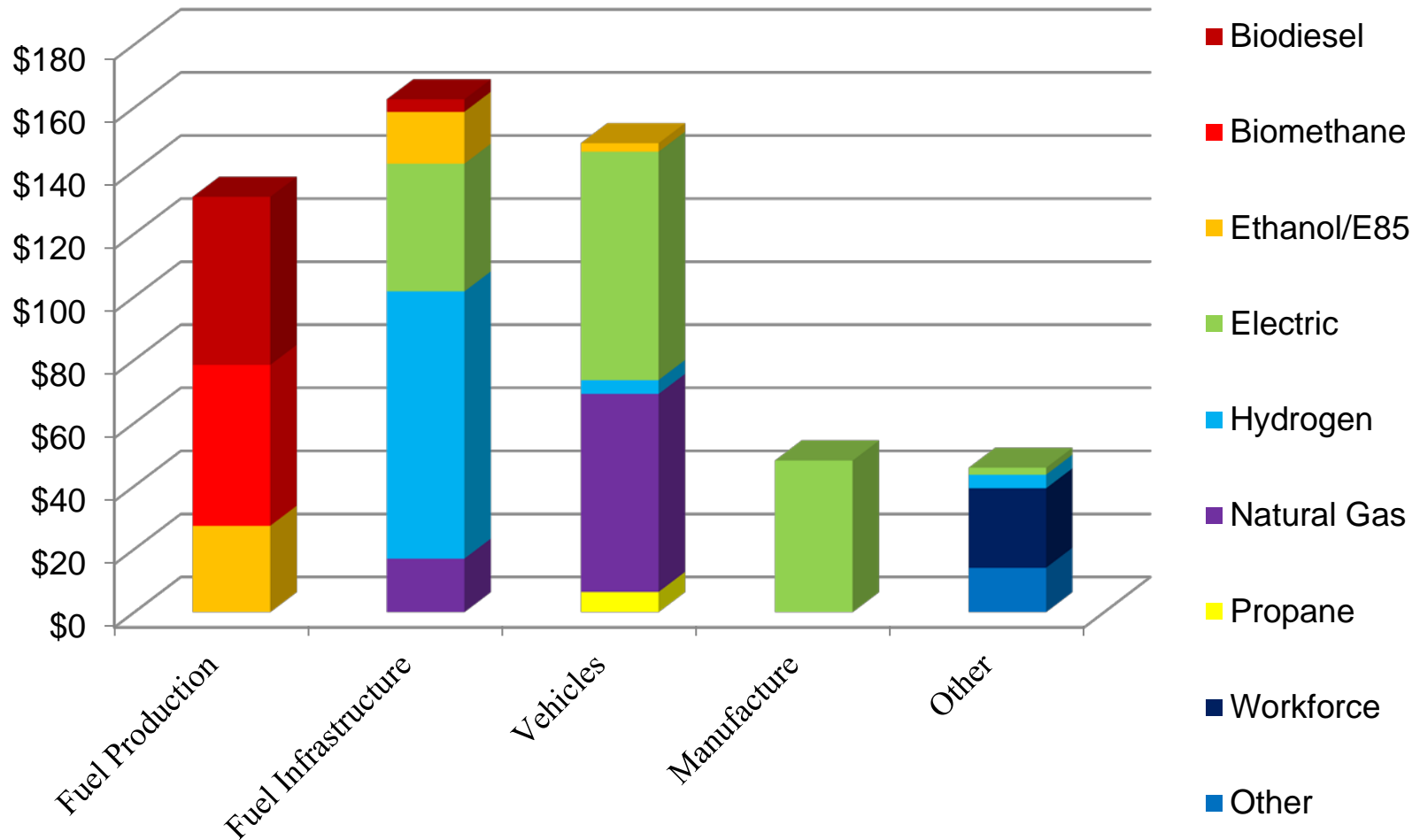


ARFVTP Funding Summary: 2009-2014

Investment Areas	Funding Amount (in millions)	Percent of Total (%)	Number of Awards
Biofuels	\$153	29	55
Electric Drive	\$160	30	128
Natural Gas	\$86	15	184
Hydrogen	\$93	18	25
Workforce Development	\$25	5	55
Market & Program Develop.	\$14	3	15
Total	\$531	100	462



Existing Agreements: 2009-2014





Electric Vehicle Support

Total EVSE Funding: \$38 million

Total Funded = 9,365 chargers

Commercial = 3,373

Residential = 5,127

Workplace = 756

DC Fast = 109

Plus 17 Regional Readiness
Planning Grants = \$4.0 M

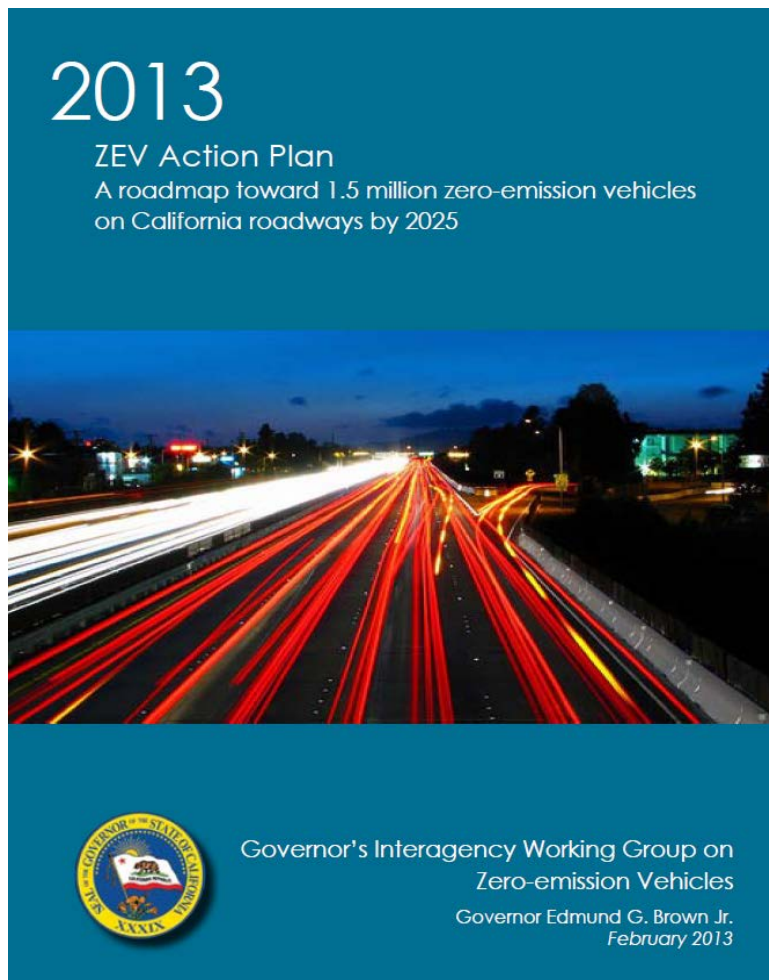
Total CVRP Support:
= \$49 million

- Over 21,000 vouchers





2013 ZEV Action Plan



- Partnership of 15 state agencies/entities, including the Energy Commission
- Driven by the Governor's Office
- 123 specific actions
 - Designates responsible agencies and timelines
- Energy Commission funding supports many Action Items
 - Regional Planning Support
 - Public Agency EVSE Funding
 - Statewide Infrastructure Plan



Hydrogen Station Funding

Funding to Date = \$90 million

Public Station Funding

45 New Stations	= \$72.7 million
3 Station Upgrades	= \$6.7 million
4 Station O&M Grants	= \$1.2 million
1 Mobile Refueler	= \$0.9 million



Other Funding Activities

AC Transit Fuel Cell Bus Station	= \$3 million
CDFA Div of Weights and Measures	= \$4 million
Retail Dispensing Fuel Standards	
UC Irvine STREET Model	= \$1.5 million
GoBiz Ombudsman Support	





FCEV market launch: 2014-2015



May 2014

Northern CA Hydrogen Stations



Open

Emeryville – AC Transit



In Development

Cupertino

Foster City

Mountain View

*West Sacramento



NOPA

Campbell

Hayward

Mill Valley

Oakland

Palo Alto

Redwood City

*Rohnert Park

San Jose

San Ramon

Saratoga

South San Francisco

*Truckee

Woodside

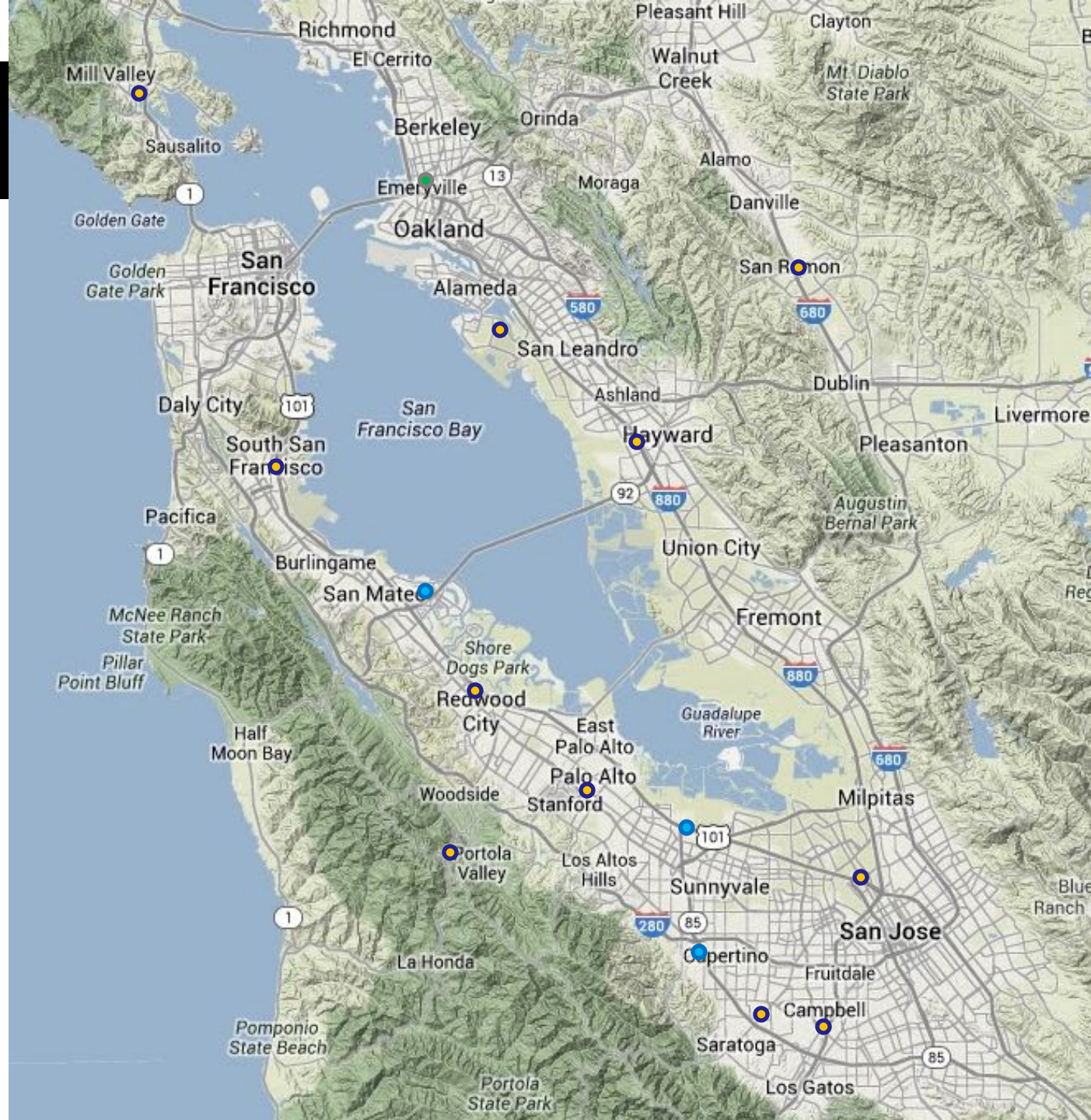
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California



DRIVING FOR THE FUTURE

Managed by BKi



Southern CA Hydrogen Stations

Open

Burbank
Fountain Valley – OCS
Irvine – UC Irvine
Los Angeles – Harbor City
Los Angeles – West LA 1
Newport Beach – Shell
*Thousand Palms – SunLine Transit
Torrance – Shell

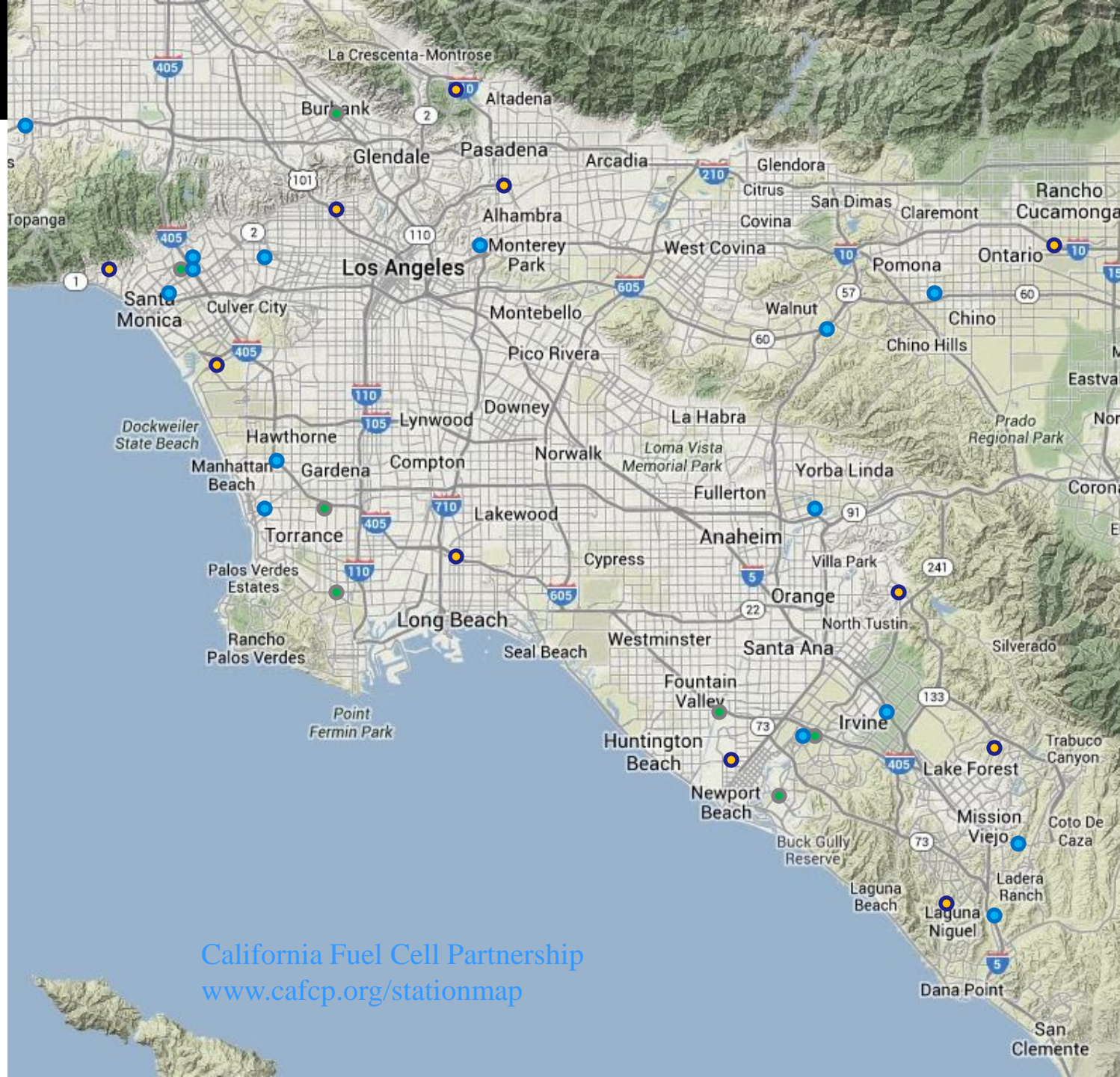
In Development

Anaheim
Chino (upgrade)
Diamond Bar (upgrade)
Irvine – UC Irvine (upgrade)
Irvine – Walnut Ave.
Lawndale
Los Angeles – Cal State LA
Los Angeles – West LA 2
Los Angeles – Westwood
Los Angeles – Woodland Hills
Los Angeles – Beverly Blvd.
Mission Viejo
Redondo Beach
San Juan Capistrano
Santa Monica 1

NOPA

*Coalinga
Costa Mesa
La Canada Flintridge
Laguna Niguel
Lake Forest
Long Beach
Los Angeles - 9
Los Angeles -10
Ontario
Orange
Pacific Palisades
*Riverside
*San Diego
*Santa Barbara
South Pasadena

*Not shown on map



California Fuel Cell Partnership
www.cafcp.org/stationmap



ARFVTP Truck Sector-Related Funding

About 30 Percent of Total Program Funding

Technology	Funding (\$ Millions)	No. of Vehicles, Fueling Stations or Projects
Commercial Natural Gas Trucks	54.3	4,470 Trucks
Natural Gas Infrastructure	16.7	60 Stations
Commercial Propane Trucks	6.4	514 Trucks
Commercial ZEV Trucks (Class 6 package delivery)	4.0	160 Trucks
Advanced Technology Truck Demonstration or Manufacturing	74.6	38 Projects
Total Funding	156.0	17



EVI-UPS Electric Truck in West Sacramento

EVI-UPS 100 Truck Deployment Project



Electric Vehicles
International:
Stockton, CA

EVI Capacities:

- Electric Drivetrains on new and retrofit chassis
- Integrating Fuel Cell Power Systems





CALIFORNIA ENERGY COMMISSION

Transpower Class 8 Electric Tractors

Energy Storage & Vehicle Control
Systems for Class 8 Applications
Poway, CA



Mike Simon, CEO

Long Beach
Demonstration
Vehicle





ARFVTP Biofuels Funding

Fuel Type	Funding (\$ millions)	No. of Projects	Production (MGY)
Biomethane	50.9	15	9.6
Ethanol	23.5	11	8.9
Cellulosic Ethanol	3.9	1	0.021
Biodiesel	36.1	12	78.8
Renewable Diesel	17.1	5	47.9
Total	131.5	44	145.2

E85 Infrastructure: \$14.6M for 161 Stations

Biodiesel Tank Storage: \$4M for 4 projects



Clean World's 100 Ton per Day Digester *Sacramento, CA*

Diverted MSW
Organics
Feedstock

\$6 million grant

15gCO₂e/MJ

RNG Fueling
Station





Crimson Renewable Fuels Biorefinery Expansion

**Bakersfield
Biorefinery
Expansion to
17 MGY**

Waste-Based
Biodiesel

\$5 million grant

14 gCO₂e/MJ





Workforce Development and Training

Partner Agency	Funded Training (in Millions)	Match Contributions (in Millions)	Trainees	Businesses Assisted	Municipalities Assisted
ETP	\$7	\$9.9	12,675	92+	14+
EDD	\$7.25	\$7.5	999	36+	-
CCCO	\$5.5	N/A	NA	480+	-
Total	\$19.75	\$17.4	13,674	608+	14+



Workforce Training Examples

California – Nevada Labor Trust: \$749,708

- Retrain 1,124 journeymen electricians for EVSE installation and maintenance.

Foothill-DeAnza Community College: \$363,636

- Training for 378 public and private fleet operators for alternative fueling infrastructure use and maintenance.

Tesla Motors: \$756,000

- Training in advanced manufacturing techniques at Tesla's Fremont factory.

Electric Vehicles International: \$494,000

- Training for 100 employees at EVI electric truck assembly plant in Stockton.



Projected Carbon Reduction Benefits from ARFVTP Investments

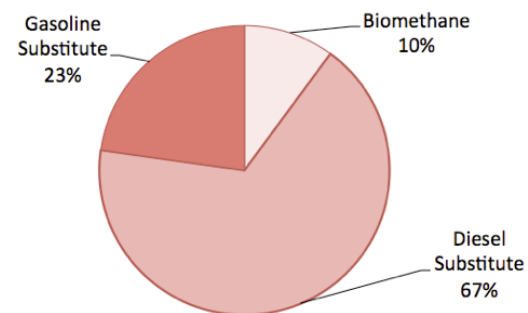
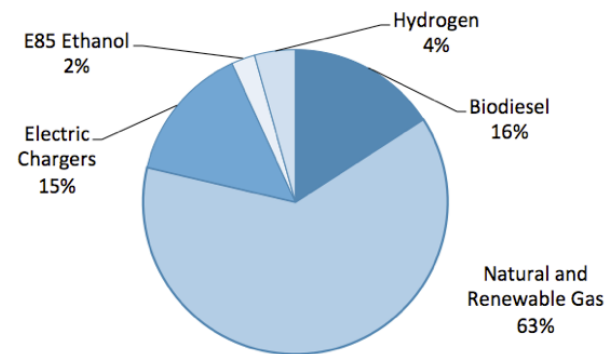
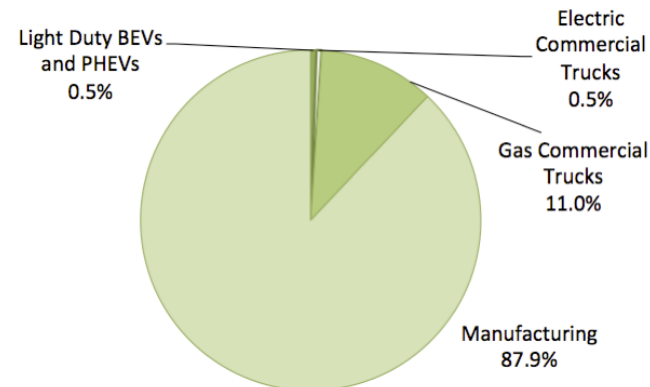
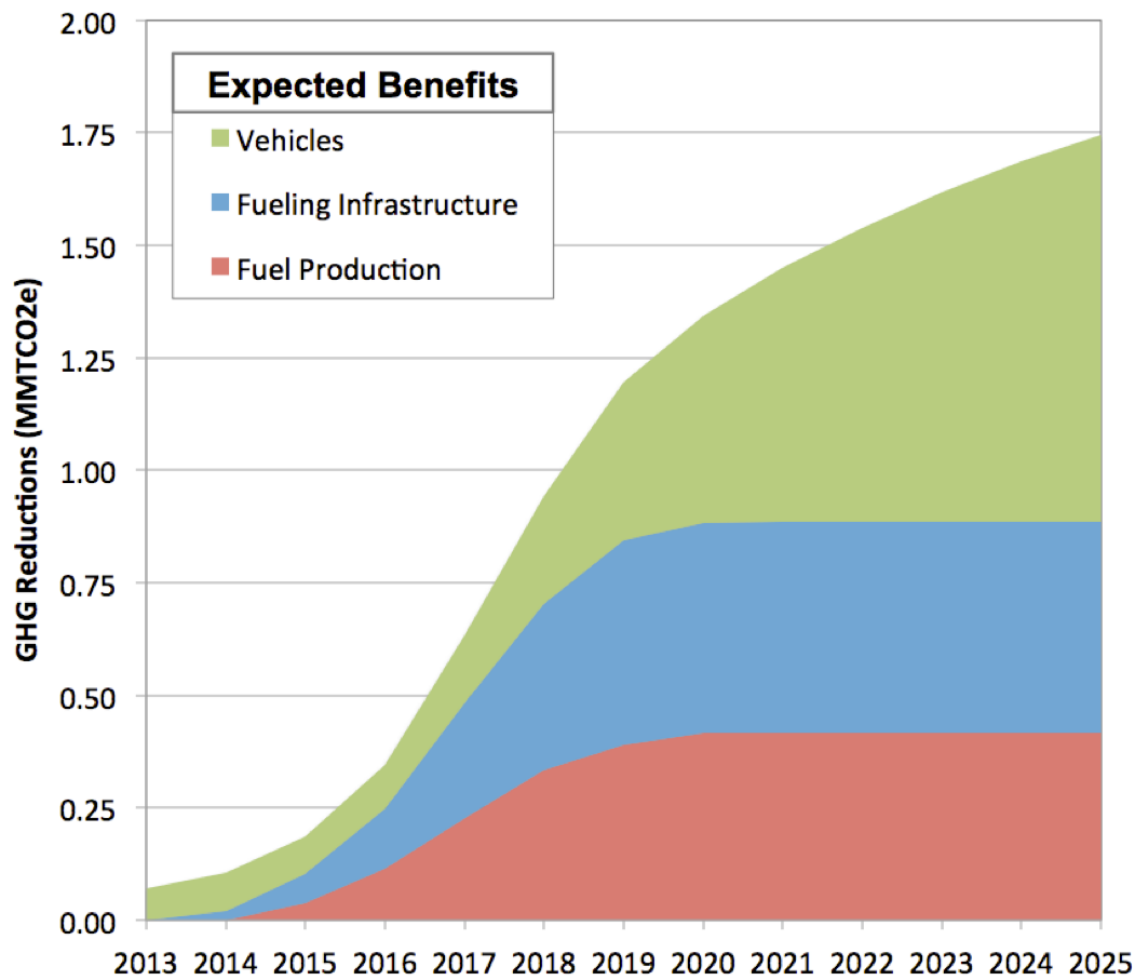
**Results from NREL's 2014 Analysis of Expected
and Market Transformation Benefits**

http://www.energy.ca.gov/2014_energypolicy/documents/#06122014

- **Dr. Marc Melaina, Principal Investigator**
 - **Analyzed 207 projects totaling \$426.1 million**



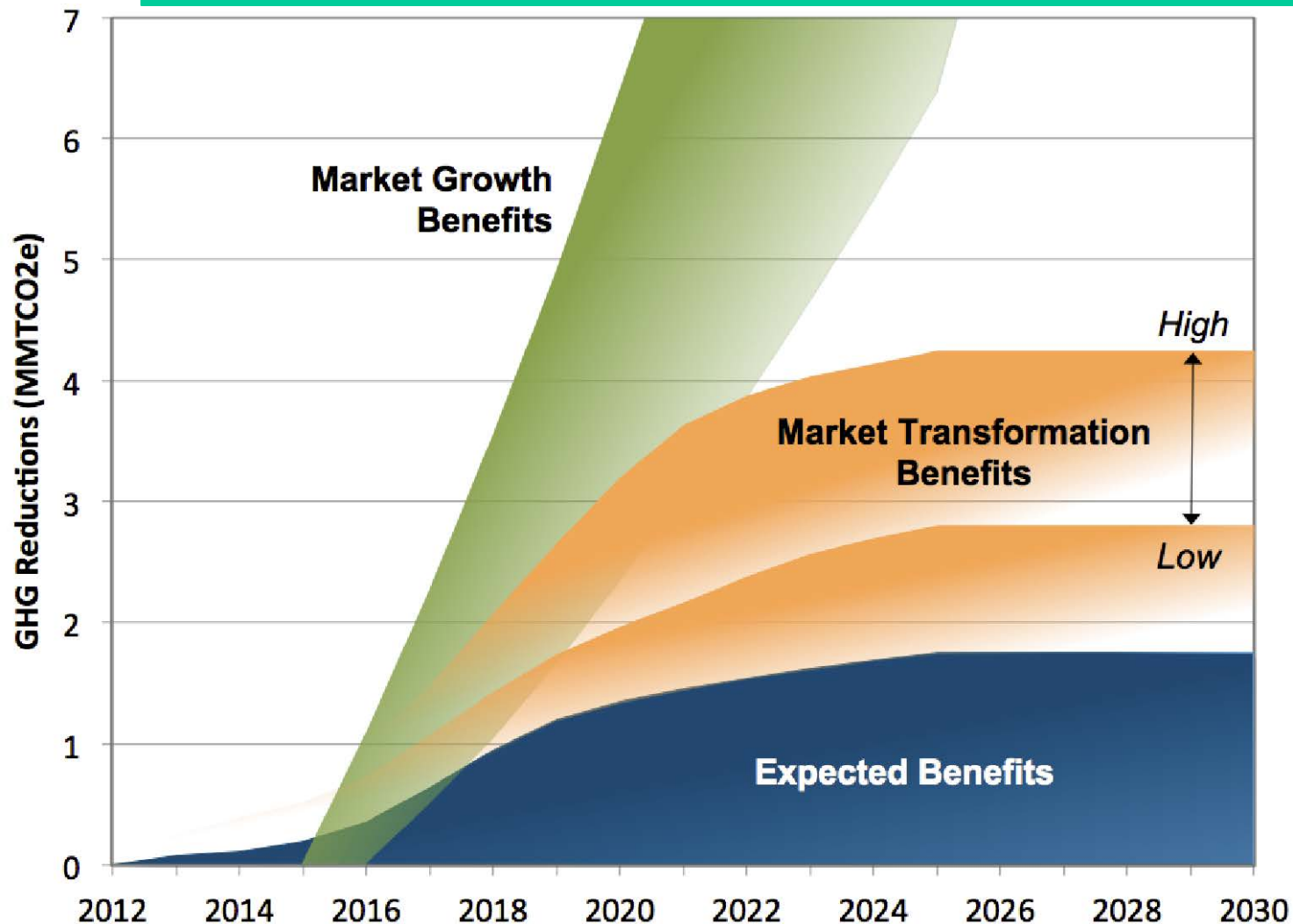
Expected GHG Reductions of Projects Funded to Date





CALIFORNIA ENERGY COMMISSION

ARFVTP projects have the potential to make significant contributions toward meeting California's GHG reduction goals





Recent Solicitations and Awards

(since last Advisory Committee meeting in February 2014)

Subject	ARFVTP Funding	# of Awards
Pilot- or Commercial-Scale Biofuel Production Facilities	\$43.6 M	11
Hydrogen Refueling Infrastructure	Nearly \$50 M	35
Electric Vehicle Charging Infrastructure	\$13.7 M	41
Federal Cost-Sharing	\$3.1 M	3
Natural Gas Vehicle Incentives	\$21.1 M	3,109 vehicle reservations



Current Solicitations

Subject	\$ Available	Notes
Manufacturing	\$10M available; Max. \$3M per project	<ul style="list-style-type: none">Proposals due November 7Proposed awards expected January 2015Must produce alternative fuel vehicles or their components
Biofuel production: Early and pre-commercial technology development	\$3M available; Max. of \$1M per project	<ul style="list-style-type: none">Focused on R&D phaseOpen to diesel substitutes, gasoline substitutes (not corn grain), biomethaneAbstracts due December 17Full proposals due March 26
ZEV Readiness	\$3.3M available; Max. \$300,000 per project	<ul style="list-style-type: none">PEV or FCEV readiness planning and/or implementationFirst come, first servedCloses December 2, or once funds exhausted



Potential Near-Term Solicitations

Subject	\$ Available	Notes
EV Charging Station Pilot Alternative Financing Program	\$1.9 M	<ul style="list-style-type: none"> • Pilot program with CPCFA • Loan Loss Reserve plus rebate • Costs could include L1, L2 and/or DC fast charger design, equipment, installation • Comments on proposal due December 8 • Could launch Q1 2015
Natural Gas Fueling Infrastructure	\$1.5 M	<ul style="list-style-type: none"> • May be limited to school and municipal fleets • Expected early Q1 2015
Natural Gas Vehicle Incentives	\$10 M	<ul style="list-style-type: none"> • UC Irvine as potential administrator • Consumer-based incentive
Medium- and Heavy-Duty Vehicle Demonstration	\$24.8 M	<ul style="list-style-type: none"> • Coordinating with ARB's proposed demonstration projects • Focused on earlier phases of technological development and commercialization • Expected Q4 2014



Links to More Information

Energy Commission DRIVE Website

www.energy.ca.gov/drive/

2014 Integrated Energy Policy Report

www.energy.ca.gov/2014_energypolicy

ARFVTP Funding Solicitations

www.energy.ca.gov/contracts/transportation.html